

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

STANDING STOCKS OF FISHES IN
SECTIONS OF LITTLE LAST CHANCE
CREEK, PLUMAS COUNTY, 1995

by

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STANDING STOCKS OF FISHES IN SECTIONS OF LITTLE LAST CHANCE CREEK, PLUMAS COUNTY, 1995

INTRODUCTION

The Department of Water Resources (DWR) initiated an instream flow program in 1976 to identify streams that would benefit from flow enhancement and to assess instream values. The Northern District of the DWR selected Little Last Chance Creek below Frenchman Reservoir (Figure 1) as one of the streams to study under this program.

Department of Fish and Game (DFG) biologists studied trout populations in Little Last Chance Creek in 1976, 1981, 1986, 1988, 1991, 1992, 1993, and 1994. Brown trout (Salmo trutta) was the only game fish caught every year. Sacramento suckers (Catostomus occidentalis) were also caught every year (Brown 1976, Bumpass et al. 1989, Brown 1991, Brown 1992a, Brown 1992b, Brown 1993, Brown 1994, Brown 1995). This report documents the results of sampling conducted in 1995.

The purpose of this study is to evaluate the effects of the operation of Frenchman Reservoir on populations of trout in Little Last Chance Creek through the periodic sampling of fish at established stations in that creek.

Results of this report and previous reports on Little Last Chance Creek will be discussed in a summary report that will evaluate the current operation of Frenchman Reservoir and make recommendations regarding its future operations.

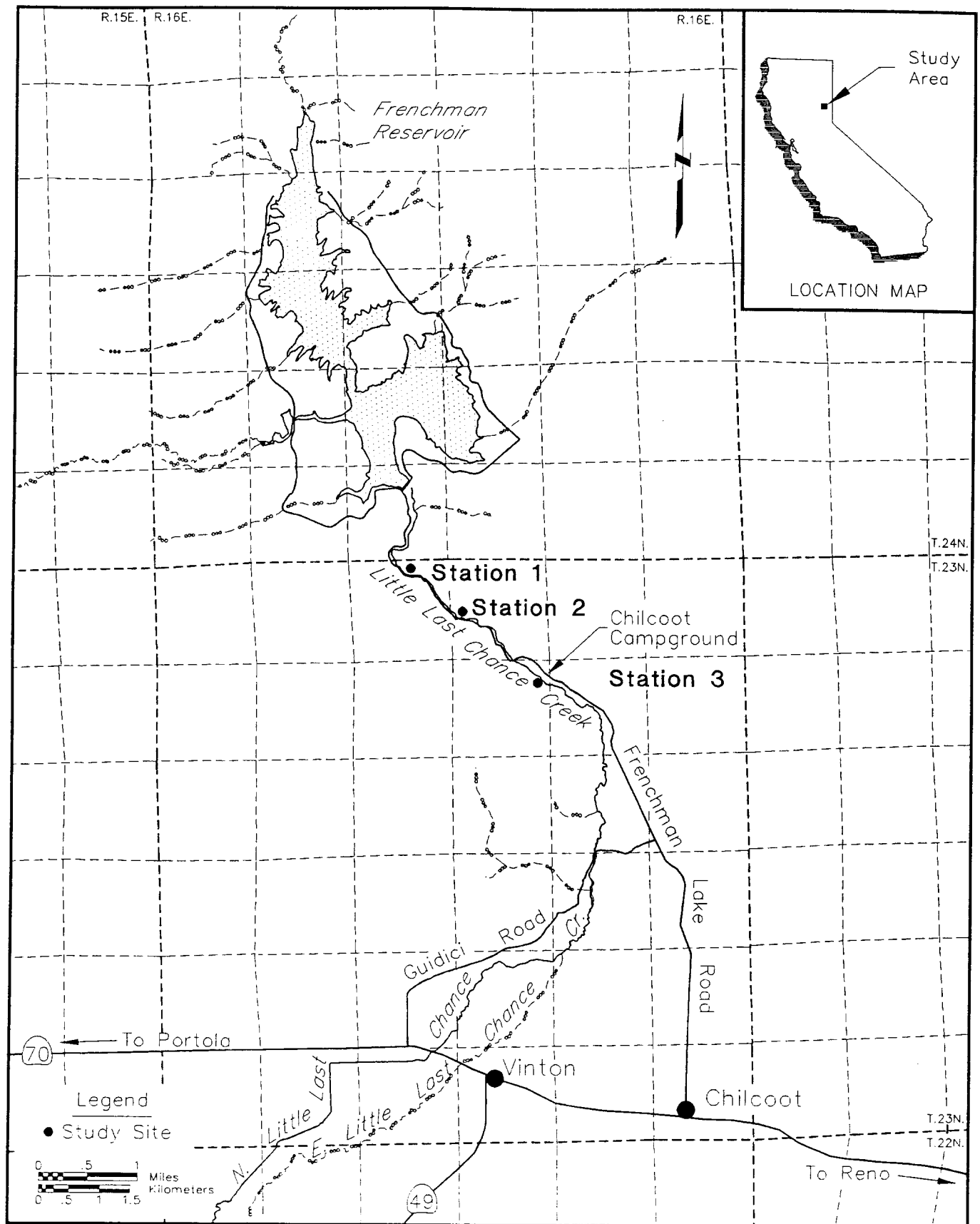


Figure 1. Stations Sampled to Estimate Standing Stocks of Fish in Little Last Chance Creek, Plumas County, 1995.

METHODS

Naturally Produced Trout

Standing stocks of fishes were estimated at three stations in Little Last Chance Creek in Plumas County in October, 1995. Stations were intentionally selected to be near stations sampled in previous DFG studies (Appendix 1). Markers had previously been placed in trees along the stream to identify station boundaries. Stations varied in length from 47.3 to 51.8 m. The length, and average width of each station was measured. Fish were captured with a battery-powered backpack electroshocker in stream sections blocked by seines. Captured fish were removed from the net-enclosed section on each pass. Standing stock estimates of naturally produced trout were developed using the two-count method of Seber and LeCren (1967) or the multiple-pass method of Leslie and Davis (1939) with limits of confidence computed using a formula proposed by DeLury (1951). Trout of hatchery origin were not included in standing stock estimates.

The weight of each naturally produced trout was determined by displacement. Fork length (FL) of each fish was measured to the nearest millimeter. Scale samples were taken for naturally produced trout.

Distribution of fish caught is listed according to location. Standing crops of brown trout were calculated for individual stations where each fish was caught.

Hatchery Trout

Trout planted in the creek that were of hatchery origin were not weighed. They were counted and measured (FL). They were not included as part of standing crop.

RESULTS AND DISCUSSION

Naturally produced brown trout ranged in size from 114 to 140 mm (Figure 2).

Brown trout biomass averaged 0.5 g/m² at three stations. Eight brown trout large enough for anglers to catch and keep (≥ 127 mm FL) were caught (Table 1).

TABLE 1. Estimate of naturally produced brown trout standing crop in Little Last Chance Creek, Plumas County, 1995.

Distance Below Frenchman Dam (km)	Population Estimate	95% Confidence Interval	Biomass (g/m ²)	Estimate of Catchable Trout (≥ 127 mm FL)	Biomass of Catchable Trout (g/m ²)
1.6	0				
3.2	8	7-11	0.7	2	0.2
4.4	12	10-21	0.8	6	0.6

Two rainbow trout were caught. One trout was caught in station 1 and one was caught in station 3. The rainbow trout caught in station 1 was 197 mm FL and weighed 87 g. The rainbow trout caught in station 3 was 89 mm FL and weighed 8g. Total rainbow trout biomass was 0.001 g/m². One rainbow trout large enough for anglers to catch and keep was caught (Table 2).

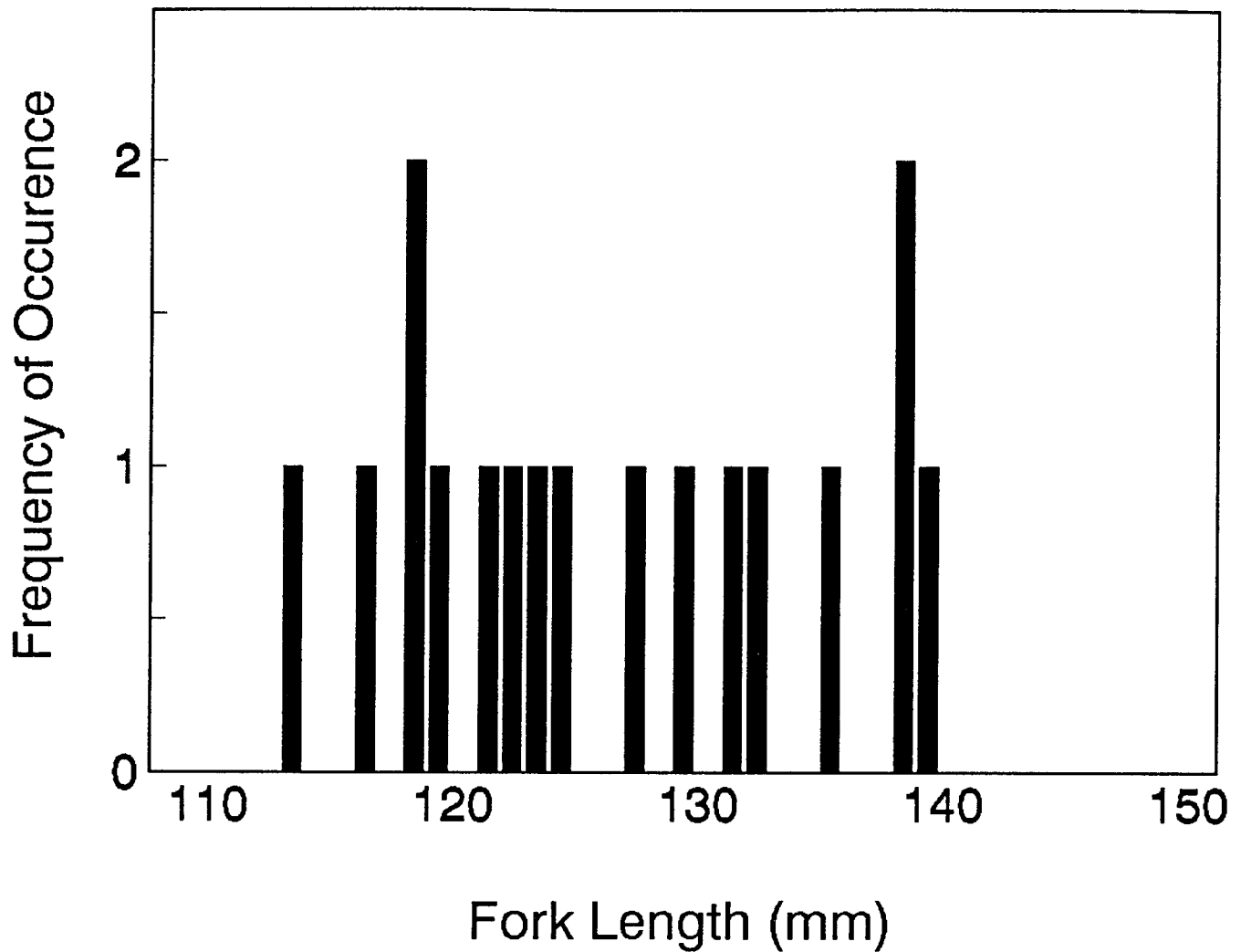


Figure 2. Length and observed frequency of naturally produced brown trout caught in Little Last Chance Creek, Plumas County, 1995.

TABLE 2. Estimate of rainbow trout standing crop in Little Last Chance Creek, Plumas County, 1995.

Distance Below Frenchman Dam (km)	Population Estimate	95% Confidence Interval	Biomass (g/m ²)	Estimate of Catchable Trout (≥ 127 mm FL)	Biomass of Catchable Trout (g/m ²)
1.6	1	1-1	0.4	1	0.4
3.2	0				
4.4	1	1-1	0.03		

The relationship between length (L) and weight (W) of brown trout is:

$$\text{Log}_{10} W = -5.1 + 3.1 \text{Log}_{10} L$$

$$r^2 = 0.91$$

$$N = 17 \text{ (Figure 3 and Appendix 2)}$$

The average condition factor of 17 brown trout was 1.0957.

Sixty one brown trout of hatchery origin were caught. They were caught at each station. The trout ranged in size from 175 to 425 mm FL and averaged 254 mm FL (Appendix 3). Individuals above 295 mm FL appeared ready to spawn. These trout are holdovers from plants the DFG made over the last three years (Brown 1995)

Brown trout population estimates before treatment averaged 10 trout and 4 trout after treatment. Biomass averaged 3.3 g/m² before treatment and 0.5 g/m² after treatment.

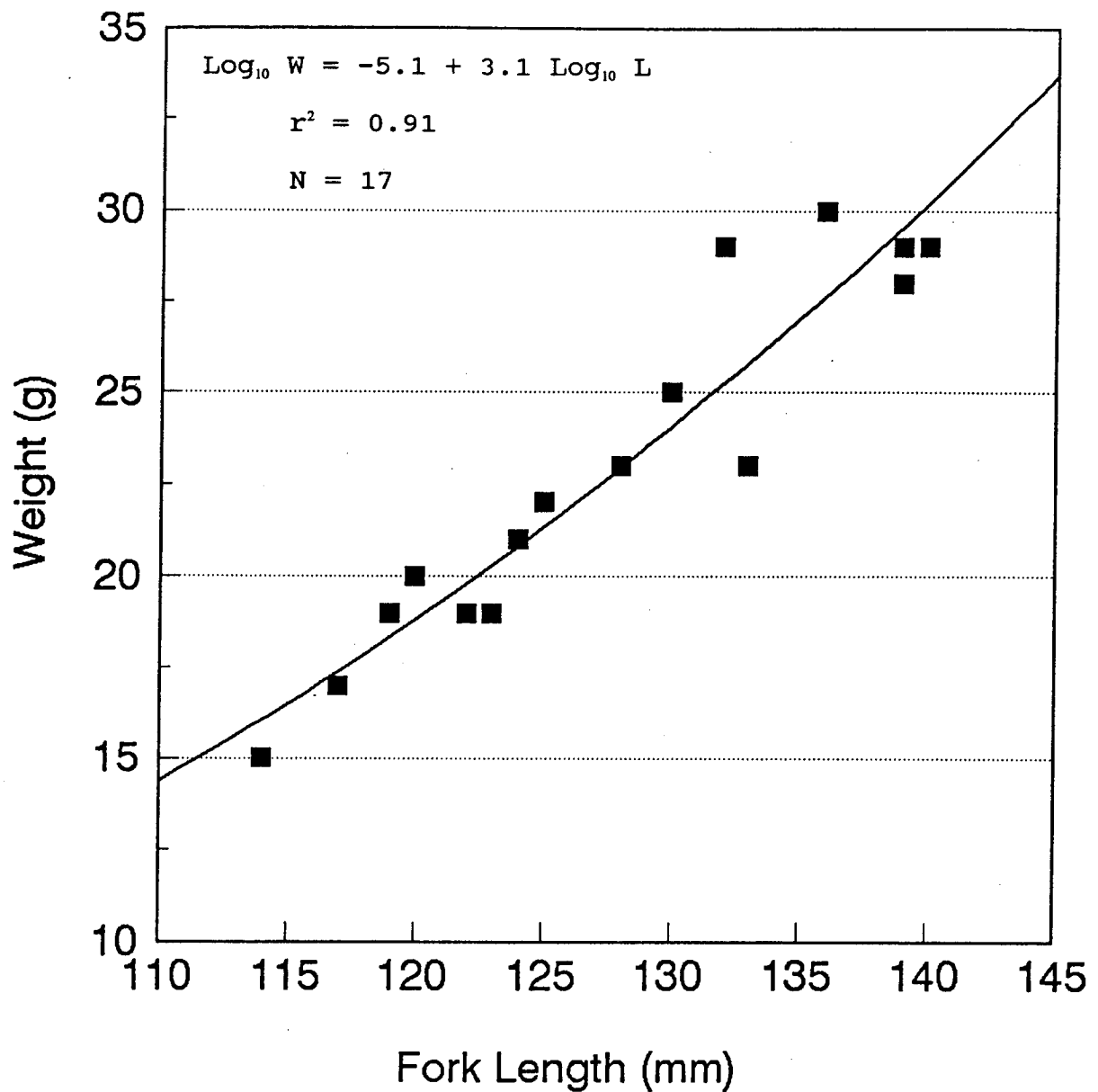


FIGURE 3. The relationship between length and weight of naturally produced brown trout caught in sections of Little Last Chance Creek, Plumas County, 1995.

Rainbow trout population estimates averaged 41 trout before treatment and <1 trout after.

Biomass averaged 7.1 g/m² before treatment and 0.1 g/m² after (Table 3).

TABLE 3. Average standing crop and biomass for naturally produced brown and rainbow trout in Little Last Chance Creek, 1976-1995.

Year	Brown Trout		Rainbow Trout	
	Population Estimate	Biomass g/m ²	Population Estimate	Biomass g/m ²
Before treatment				
1976	1	1.2	8	13.9
1981	6	2.7	17	4.0
1986	10	3.7	96	3.8
1988	21	5.5	43	6.5
After treatment				
1991	0	0	0	0
1992	0	0	1	0.5
1993	0	0	0	0
1994	0	0	0	0
1995	20	1.5	2	0.001

Most of the trout we caught this year were planted by the DFG in spring and summer 1993, 1994, and 1995. The DFG planted fingerling and catchable brown trout and rainbow trout in 1993, fingerling brown trout in 1994, and catchable brown trout in 1995 (Ron DeCoto, Fishery Biologist, DFG, personal communication). The small trout (114-140 mm) we caught this year were the offspring of hatchery trout that spawned in October 1994. The larger trout (182-425 mm) survived from plants over the last few years.

So few fish were caught (Table 2) because the DFG treated Frenchman Reservoir, Little Last Chance Creek and parts of the Feather River with rotenone to kill northern pike (Esox lucius) in 1991. The DFG killed northern pike in this watershed to prevent them from migrating downstream into the Sacramento River. The DFG feels that pike could become established in the Sacramento River and become significant predators on juvenile salmonids (Brown 1992).

We caught 12 large trout (295-425 mm FL) that were nearly ripe. They probably spawned in October or November. We have observed that spawning gravel is concentrated above station 1 (Figure 1). That is where we expect most trout to spawn. If spawning has been successful we should observe age 0+ trout in all stations because they will distribute themselves downstream through the spring and summer in search of food and space.

While our periodic sampling of trout in Little Last Chance Creek has allowed us to observe the prolonged effects of rotenone on trout populations and their recovery, the purpose of our study has not changed. We still plan to evaluate the effects of the operation of Frenchman Reservoir on trout populations in Little Last Chance Creek.

LITERATURE CITED

- Brown, C.J. 1976. Standing stocks of fishes in sections of Red Clover, Little Last Chance, Big Grizzly, Last Chance, and Squaw Queen Creeks, Plumas County, 1976. Calif. Dept. of Fish and Game. 17 p.
- _____. 1991. Standing stocks of fishes in sections of Little Last Chance Creek, Plumas County, 1988. Calif. Dept. of Fish and Game. 20 p.
- _____. 1992a. Standing stocks of fishes in sections of Little Last Chance Creek, Plumas County, 1981. Calif. Dept. of Fish and Game. 20 p.
- _____. 1992b. Standing stocks of fishes in sections of Little Last Chance Creek, Plumas County, 1991. Calif. Dept. of Fish and Game. 8 p.
- _____. 1993. Standing stocks of fishes in sections of Little Last Chance Creek, Plumas County, 1992. Calif. Dept. of Fish and Game. 10 p.
- _____. 1994. Standing stocks of fishes in sections of Little Last Chance Creek, Plumas County, 1993. Calif. Dept. of Fish and Game. 10 p.
- _____. 1995. Standing stocks of fishes in sections of Little Last Chance Creek, Plumas County, 1994. Calif. Dept. of Fish and Game. 10 p.
- Bumpass, D.K., K.Smith, and C.J. Brown. 1989. Standing stocks of fishes in sections of Big Grizzly and Little Last Chance Creeks, Plumas County, 1986. Calif. Dept. of Fish and Game. 36 p.
- DeLury, D.B. 1951. On the planning of experiments for the estimation of fish populations. J. Fish. Res. Bd. Canada. 8:281-307.
- Leslie, P.H., and D.H.S. Davis. 1939. Attempt to determine the absolute number of rats in a given area. J. Animal Ecology. 8:94-113.
- Seber, G.A.F., and E.D. LeCren. 1967. Estimating population parameters from catches large relative to the population. J. Animal Ecology. 36(3):631-643.

APPENDIX 1

PERMANENT FISH POPULATION STATIONS FOR LITTLE LAST CHANCE CREEK, PLUMAS COUNTY OCTOBER 1995.

Station 1 - Located 1.6 km below Frenchman Dam just downstream from the first bridge at elevation of 1659 m MSL in NW 1/4 of NE 1/4, Section 4, T23N, R16E. This station begins in a riffle beneath the bridge carrying Frenchman Lake Road, then enters a pool with a deeply undercut room-sized boulder on the right bank. The remainder of the station is a short riffle and a shallow pool/run. About 55 percent of the station is pool and 45 percent riffle. Substrate is boulder, rubble, and sand. The station is 47.3 m long with a surface area of 203.4 m² at a flow of 0.4 cms.

Station 2 - Located 3.2 km below Frenchman Dam adjacent to the upper end of a large turnout at an elevation of 1610 m MSL in NW 1/4 of SW 1/4, Section 3, T23N, R16E. This station begins in a large plunge pool followed by two shallow pool/run areas and two short riffles. About 45 percent of the station is pool and 55 percent riffle. Substrate is boulder, rubble, and sand. The station is 48.8 m long with a surface area of 234.2 m² at a flow of 0.4 cms.

Station 3 - Located 4.4 km below Frenchman Dam adjacent to the cutoff road in the center of Chilcoot Campground at an elevation of 1561 m MSL in NE 1/4 of NE 1/4, Section 10, T23N, R16E. This station begins in a steep rapid followed by a long pool with undercut right bank, then a short riffle, a short pool, and finally, another steep riffle. The station is 40 percent pool and 60 percent riffle. Substrate is boulders, rubble, and sand. The station is 51.8 m long with a surface area of 284.9 m² at a flow of 0.4 cms.

APPENDIX 2

LENGTH AND WEIGHT OF NATURALLY PRODUCED BROWN TROUT IN LITTLE LAST CHANCE CREEK, OCTOBER, 1995.

Length (mm)	Weight (g)
114	15
117	17
119	19
119	19
120	20
122	19
123	19
124	21
125	22
128	23
130	25
132	29
133	23
136	30
139	28
139	29
140	29

APPENDIX 3

LENGTH AND NUMBER OF HATCHERY BROWN TROUT CAUGHT IN LITTLE LAST CHANCE CREEK, OCTOBER 1995.

<u>Fork Length (mm)</u>	<u>Frequency</u>	<u>Fork Length (mm)</u>	<u>Frequency</u>
182	1	251	1
186	1	256	1
191	1	259	1
198	1	260	1
200	1	270	1
205	1	271	3
208	1	272	1
212	2	274	2
215	2	275	1
221	3	279	1
222	1	281	2
226	1	284	1
232	1	286	1
233	2	295	2
234	2	299	1
240	2	304	1
242	1	326	1
243	2	335	2
245	1	345	1
246	1	352	1
247	1	374	1
250	3	425	1